CLAIMS

It is claimed:

1. A method of controlling the presence of surface and airborne carried microorganisms in an air treatment apparatus having a drain pan and a heat transfer coil comprising a tube and a plurality of spaced parallel fins, comprising the steps of:

positioning a germicidal tube adjacent to the coil and drain pan of an air treatment apparatus in a position substantially perpendicular to the parallel planes of the fins;

energizing the germicidal tube to emit substantially uniformly distributed UV radiation across the coil face to the coil's tube fins and the drain pan;

reflecting and directing the UV radiation by the coil's tube and the fins throughout the coil, thereby increasing the flux density of the UV radiation and the dosage of the radiation applied to airborne microorganisms and microorganisms carried on the surfaces of the coil and drain pan.

2. The method of claim 1 wherein said reflecting and directing of the UV radiation received by the coil, the fins and the drain pan is effected by the reflectivity of UV radiation from the materials from which the coil, the coil and the drain pan are fabricated, thereby increasing the flux density of said radiation.

3. The method of claim 2 wherein said reflecting and directing of the UV radiation reflected from said coil, said fins and said drain pan components continues until said radiation is absorbed, thereby increasing the dosage of radiation applied to said components.

4. In an air conditioning system wherein a germicidal tube is positioned within the air stream to emit UV radiation for controlling the presence of microorganisms in the air conditioning system, said air conditioning system including a heat transfer coil having a plurality of parallel spaced fins and a drain pan, the improvement comprising:

positioning said germicidal tube adjacent to said heat transfer coil and said drain pan in a position substantially perpendicular to the parallel planes of said fins to emit substantially uniformly distributed UV radiation across the face of said coil such that the UV radiation received by said coil, said fins and said drain pan is reflected and directed throughout the coil, the fins and the drain pan to thereby increase the flux density of the UV radiation and the dosage of the UV radiation applied to airborne and surface microorganisms carried therein and thereon.

5. In an air conditioning system including a heat transfer coil, a blower or fan for generating an air flow through the system and a germicidal tube positioned within the air flow generated by said blower or fan to emit UV radiation to control the presence of microorganisms in said air conditioning system, said heat transfer coil including a plurality of spaced parallel fins and an adjacent drain pan, the improvement comprising:

a germicidal tube positioned downstream of and adjacent to said coil and said drain pan of said air conditioning system in a position substantially perpendicular to the parallel planes of said fins for emitting substantially uniformly distributed UV radiation across said coil face such that the emitted UV radiation is reflected and directed throughout said coil, said fins and said drain pan to increase the flux density of the UV radiation and the dosage of

the UV radiation applied to airborne and surface microorganisms carried on and in said air conditioning system.

6. A method of reducing energy consumption in a heat transfer system through UVC irradiation, the heat transfer system comprising a heat exchanger having a surface, wherein the heat transfer system has an energy consumption level associated with an "as new" condition, and wherein during operation of the heat transfer system, organic matter accumulates upon the surface of the heat exchanger, the accumulated organic matter thereby degrading the performance of the heat transfer system and resulting in an energy consumption level elevated above that associated with the "as new" condition, the method comprising the steps of:

energizing a germicidal tube to emit distributed UV radiation;

directing the UV radiation at the heat exchanger to degrade and vaporize the accumulated organic matter on the surface of the heat exchanger;

maintaining energization of the germicidal tube until the accumulated organic matter deposited on the surface of the heat exchanger is substantially eliminated; and

operating the heat transfer system, whereby organic matter subsequently accumulates on the surface of the heat exchanger, and energizing the germicidal tube intermittently to degrade and vaporize the subsequently accumulated organic matter;

whereby energy consumption of the heat transfer system is maintained substantially at the energy consumption level associated with the "as new" condition.

7. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 6, the heat exchanger comprising a heat transfer coil including a plurality of spaced fins, the method further comprising reflecting and directing the UV radiation by the fins, thereby increasing the distribution and flux density of the UV radiation and the dosage of the radiation applied to the accumulated organic matter.

8. The method of reducing of energy consumption in a heat transfer system through UVC irradiation of claim 7, wherein the fins are parallel to one another, the method further comprising aligning the longitudinal axis of the germicidal tube in a position substantially perpendicular to the parallel planes of the fins.

9. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 7 wherein the reflecting and directing of the UV radiation received by the heat transfer coil is effected by the reflectivity of UV radiation from the materials from which the heat transfer coil is fabricated, thereby increasing the flux density of the radiation.

10. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 6 wherein the heat exchanger reflects and distributes UV radiation around the heat exchanger to thereby increase the dosage of radiation applied to surfaces of the heat exchanger.

11. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 6 wherein the heat transfer system comprises a cooling system.

12. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 6 wherein the heat exchanger comprises a cooling coil.

13. A method of reducing energy consumption in a heat transfer system through UVC irradiation, the heat transfer system comprising a heat exchanger having a surface, wherein the heat transfer system has an energy consumption level associated with an "as new" condition, and wherein during operation of the heat transfer system, organic matter accumulates upon the surface of the heat exchanger, the accumulated organic matter thereby degrading the performance of the heat exchanger and resulting in an energy consumption level elevated above that associated with the "as new" condition, the method comprising the steps of:

positioning a germicidal tube a distance from the surface of the heat exchanger equal to about forty to ninety percent of the light string centerline;

energizing the germicidal tube to emit distributed UV radiation; and

operating the heat transfer system, whereby organic matter accumulates on the surface of the heat exchanger;

whereby the accumulating organic matter is degraded and vaporized by the UV radiation and eliminated; and

whereby energy consumption of the heat transfer system is maintained substantially at the energy consumption level associated with the "as new" condition.

14. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 13, the positioning step comprising positioning the germicidal tube a

distance from the surface of the heat exchanger equal to about eighty percent of the light string centerline.

15. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 14 wherein the surface of the heat exchanger includes plural fins, the positioning step comprising positioning the germicidal tube a distance from the fins equal to about eighty percent of the light string centerline.

16. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 13, the method further comprising the steps of:

maintaining energization of the germicidal tube until the accumulated organic matter deposited on the surface of the heat exchanger is substantially eliminated;

energizing the germicidal tube intermittently to degrade and vaporize newly accumulated organic matter to eliminate the newly accumulated deposited organic matter.

17. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 13, wherein a germicidal lamp comprises the germicidal tube and further includes a reflector, the method further comprising:

positioning the germicidal lamp such that the germicidal tube is between the reflector and the heat exchanger, and

aiming the reflector toward the heat exchanger.

18. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 13 wherein the heat transfer system comprises a cooling system.

19. The method of reducing energy consumption in a heat transfer system through UVC irradiation of claim 13 wherein the heat exchanger comprises a cooling coil.

20. A heat transfer system having an energy consumption level associated with an "as new" condition, the heat transfer comprising:

an air handler for moving an air stream, the air stream comprising organic matter;

a heat exchanger positioned in the air stream from the air handler, wherein at least a portion of the organic matter in the air stream deposits on a surface of the heat exchanger;

a germicidal lamp having a light string centerline and producing UV radiation, the germicidal lamp having a position a distance from the surface of the heat exchanger equal to about forty to ninety percent of the light string centerline;

wherein the organic matter deposited on the surface of the heat exchanger degrades the performance of the heat transfer system and results in an energy consumption level of the heat transfer system elevated above that associated with the "as new" condition, the organic matter deposited on the surface of the heat exchanger is degraded and vaporized by the UV radiation and eliminated;

whereby energy consumption of the heat transfer system is maintained substantially at the energy consumption level associated with the "as new" condition.

21. The heat transfer system having an energy consumption level associated with an "as new" condition of claim 20, wherein the heat exchanger includes plural fins on the surface.

22. An air handling system comprising the cooling system of claim 20.

23. An HVAC system comprising the cooling system of claim 20.